

WINTER VEGETABLE STORAGE

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MANY OF THE VEGETABLES commonly grown in Illinois home gardens can be stored for several months and used as an important part of the family's winter food supply.

Only mature vegetables of the best quality possible, free from injuries and defects, should be selected for this purpose, however; for even under favorable storage conditions most vegetables will gradually deteriorate. The object is to provide conditions that will retard deterioration as long as possible.

The home gardener's main difficulty in storing a winter supply of vegetables lies in the fact that different crops require markedly different conditions of temperature, humidity, and air circulation; and most people must make the best use of the space they already have. While some are so fortunate as to have or to be able to build an outdoor cellar or other shelter especially adapted for the purpose, most people will have to find space in the basement, attic, or garage, or in dirt-and-straw storage pits.

Vegetables That Can Be Stored Successfully

BEETS, CARROTS
TURNIPS
WINTER RADISHES

In order to keep well in storage these vegetables should come from late plantings (page 2) even tho some of the vegetables from spring plantings are still available. They should be left in the field until late fall, for light frosts will not harm them, then pulled or dug and all but $\frac{1}{4}$ inch of the tops trimmed off. Do not wash them.

These crops keep well in an unheated basement, a storage cellar, or



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if the basement is heated, in a ventilated room partitioned off from the rest of the basement. The heated part of the basement is not so satisfactory because the temperature is usually too high.

For storing in a basement, garage, or a storage cellar, pack these vegetables in boxes or baskets in loose moist sand or fine moist soil. The sand or soil prevents the vegetables from drying out, and even in the garage the temperature will be high enough in many winters so that the vegetables will keep for two or three months.

In northern Illinois, where the winters are relatively severe, these vegetables—beets, carrots, turnips, and winter radishes—may be kept in outdoor storage pits also or in a sunken barrel for late winter and spring use. In central and southern Illinois pit storage is often not satisfactory because the temperature in the pits during mild winters becomes too high and spoilage is sure to result. Vegetables for pit storage must be harvested as late in the fall as possible without being in danger of freezing, for unless low temperatures follow the placing of these vegetables in the pits, the vegetables may spoil quickly.

Constructing a storage pit. Usually no excavation at all is needed for a storage pit. Select a well-drained area and place the vegetables

in a conical pile on a 6-inch layer of straw or similar material and cover with another 6-inch layer of straw. Cover this last layer of straw with just enough earth to hold the straw in place but leave some



straw sticking thru the top for ventilation. As cold weather approaches, add another 5 or 6 inches of earth. During long periods of severe weather put on 6 or 8 inches of cornstalks or coarse manure.

Sometimes several small pits are better than one large one. If a small quantity of an assortment of vegetables is put into each pit, the entire content of a pit can be removed at one time and kept temporarily

When to Plant Vegetables to Be Stored

Central Illinois

Beets—July 10
Cabbage—June 10
Carrots—May 15
Celery—June 1
Chinese cabbage—July 15
Endive—July 10
Horseradish—April 1
Kale—July 10

Kohlrabi—Aug. 1
Leeks—April 1
Onions—April 1
Parsnips—April 15
Peppers—May 10
Popcorn—May 1
Potatoes—June 1
Pumpkins—May 15

Salsify—April 15
Squash—May 15
Sweet potatoes—May 15
Tomatoes—May 10
Turnips—Aug. 1
Winter radish—Aug. 1

Southern Illinois: April-June plantings should be two weeks earlier and July-August plantings two weeks later than above.

Northern Illinois: April-June plantings should be two weeks later and July-August plantings two weeks earlier.

in the basement of the house until used. If when they are moved to the basement they are placed in a box of moist sand, they will keep better than if left exposed to the air.

PARSNIPS, SALSIFY Frequently these crops are better left in the field than placed in storage. If the ground is not frozen too hard, they can be harvested in mild intervals during the winter; otherwise they may have to remain in the ground until spring. When they are left in the field, alternate freezing and thawing, which may cause them to spoil, can be prevented by covering with a mulch of leaves or straw held down by a light layer of soil. If they are frozen when harvested, put them in moist soil or sand in a cool place to thaw out gradually before using them.

Since these three crops are not injured by freezing, they can be stored all winter in moist soil or sand in the garage or other service building. They may also be stored as beets and carrots are stored.

STORAGE OF VEGETABLE CROPS

Vegetable	Best storage conditions			Maximum storage time	Where they can be stored (B = basement, pits = storage pits)
	Temperature	Relative humidity	Air circulation		
	<i>°F.</i>	<i>perct.</i>		<i>months</i>	
Beets.....	32-40	90-95	Little	4-5	B, pits, stor. cellar, garage
Cabbage.....	32-40	90-95	Little	5	B, pits, stor. cellar, garage
Carrots.....	32-40	90-95	Little	6	B, pits, stor. cellar, garage
Celery.....	31-32	90-95	Little	2-4	B, frames, stor. cellar
Chinese cabbage..	32-34	95-98	Little	3-4	B, frames, stor. cellar
Dried seed.....	30-32	70-75	Ample	Indefinite	Attic, garage
Endive.....	32	90-95	Ample	15-24 days	Frames
Herbs.....	32	90-95	Ample	Indefinite	B, attic, garage
Horseradish.....	32	90-95	Little	4-6	B, pits, stor. cellar, garage
Kale.....	32	95-98	Ample	1	Frames
Kohlrabi.....	32-40	90-95	Little	2-3	B, pits, stor. cellar
Leeks.....	32	85-90	Ample	1-3	B, pits, stor. cellar
Onions.....	31-32	70-75	Ample	5	B, attic, garage
Parsnips.....	32	90-95	Little	5	B, pits, stor. cellar, garage
Peppers.....	32	85-90	Little	1-1½	B, stor. cellar, garage
Popcorn.....		70	Little	Indefinite	B, attic, garage
Potatoes.....	36-60	85-90	Little	3-5	B, pits, stor. cellar
Pumpkins.....	40	70-75	Ample	2-3	B, attic, garage
Salsify.....	32	90-95	Little	4-5	B, pits, stor. cellar, garage
Squash.....	40	50-70	Ample	2-6	B, attic, stor. cellar
Sweet potatoes...	50-55	80-90	Ample	4-6	B, garage
Tomatoes— green ripe.....	50-60	95-98	Little	1	B, garage
Tomatoes—ripe...	40	95-98	Little	10 days	B, garage
Turnips.....	32	90-95	Little	2-4	B, pits, stor. cellar, garage
Winter radishes...	32	90-95	Little	2-4	B, pits, stor. cellar, garage

Note.—Some of the above data are from N. Y. Agr. Col. (Cornell) Ext. Bul. 602 and some are from U. S. Dept. Agr. Dept. Cir. 278.

CABBAGE Cabbage can be left in the field until late fall since light frosts do not harm it. A basement or storage cellar having high relative humidity and a temperature of 40° to 60° F. is satisfactory. Roughly trim each head and cut off the roots. If humidity is too low, cover the heads with moist soil or sand. This covering will help also to keep down objectionable odors.

For pit storage leave the heads untrimmed and the roots on. Place them upside down in narrow rows about three heads wide on the surface of the ground and cover with enough soil to prevent alternate freezing and thawing. Straw, leaves, or similar material packed around the heads before the soil is put on makes it easier to remove them, especially when the ground is frozen hard.



Cabbage is not injured by freezing provided it is allowed to thaw out gradually in moist soil after it is removed from the pit.

POTATOES Potatoes in storage should be protected from strong light. Altho they keep longer at 36° to 40° F., they have a better cooking quality if stored at a higher temperature. If kept at a temperature below 40° F. for some time, they tend to be undesirably sweet and dark colored when cooked; this condition may be partly corrected by exposing them to ordinary room temperatures for about 10 days before using them.

When put in the basement or in a storage cellar, potatoes should be kept in slatted bins for ventilation and left uncovered. They may also be kept in storage pits like those for root crops if they are protected against freezing.

Early potatoes should be dug as needed since they keep better in the field and suitable storage conditions are usually not available. When potatoes are left in the field, heavy rains and high temperatures after they have matured may cause them to start a new growth. If this happens they should be dug, but they will continue to sprout in storage and should be used within a month or two.

Late plantings of either early or late varieties should be made for winter storage.

ONIONS When onions mature normally they should be pulled as soon as most of the tops fall over, turn yellow, and start to dry. Premature dying resembling normal maturity often results from thrips damage; onions damaged in this way do not store well and should not be har-

vested for another two or three weeks, unless heavy rains and high temperatures threaten to cause a new growth.

Large quantities of onions in the field are usually cured in wind-rows, being turned occasionally so they will dry evenly. Small quantities may be placed in racks or spread out on dry wooden floors, or the tops may be braided together and the bunches hung in a dry airy place to cure. At the approach of winter they should be stored in a dry well-ventilated place at a temperature just above freezing. They can be stored in a garage or other service building or in a ventilated attic in baskets or crates, or hung on the walls in braids or bunches, provided they are removed to a warmer place in freezing weather.

SQUASH These vegetables are harvested for storage as they mature;
PUMPKINS 3 or 4 inches of stem must be left on. They should be handled carefully to avoid injury. Curing them for a few days at a temperature of 80° to 85° F. will finish ripening the fruit and allow mechanical injuries to callus. They may then be kept where it is dry—on shelves or racks in the furnace room or in a garage or ventilated attic until freezing weather. Varieties with thick hard shells keep best.

SWEET Sweet potatoes should be dug as they mature or soon after
POTATOES the first killing frost. If the vines become frozen and the harvest has to be delayed, they should be cut off at the soil surface soon after freezing; otherwise if warm rainy weather follows, the vines will decay rapidly, and the decay may penetrate to the potatoes.

Sweet potatoes are easily injured and must be handled carefully at all times. It is best to sort them in the field and place them in crates at that time, for the extra handling involved in sorting them in storage usually increases losses. They should be cured for two weeks at 80° to 85° F. before they are put into storage. The best storage temperature is around 50° to 55° F. The furnace room, altho usually having a somewhat higher temperature, makes a good storage place; the higher temperature merely results in slightly greater shrinkage.

PEAS For dry storage, peas and beans are harvested as they dry
BEANS but before the pods crack open. The pods may be picked off the plants or the whole plant pulled and placed in a dry airy place to cure. After the peas or beans are thoroly dried, they should be shelled, cleaned, sorted, and stored in a cool, dry, dark place, such as the attic. Fruit jars or cans make good storage containers; if the beans or peas are intended for seed, the containers should not be tightly sealed.

If a few drops of carbon disulfid are placed in each jar of beans

and the jar closed tight, any weevils that may be present will be killed without affecting the flavor and germination of the beans. (*This material must be kept away from fire as it is highly inflammable.*)

Weevils may also be killed by heating the beans to 150° F. for 1 hour; such heating, however, means that the beans can no longer be used as seed.

CELERY, KALE CHINESE CABBAGE ENDIVE, LEEKS

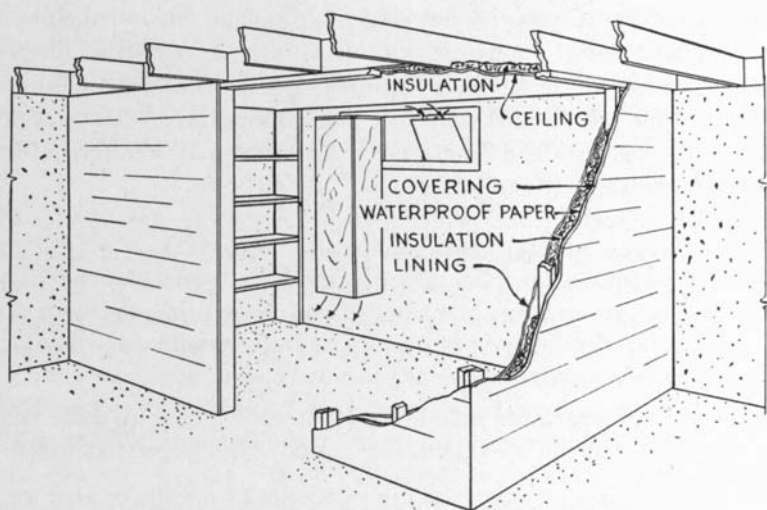
These vegetables may be stored in trenches outdoors or in boxes of soil in the basement. In digging the plants leave some soil on their roots, and set them as close to each other as possible. Water the soil around the roots of the stored plants often enough to prevent wilting, but leave the leaves and stems dry. When placed in field trenches, these vegetables must be covered with cornstalks or straw to prevent freezing during moderately cold weather; this method cannot be relied on, however, to protect the plants in severe weather.

These and other succulent crops may also be stored in cold frames if the frames are covered with some protective material during severe weather.

Where to Store the Crops

Basement. Unheated basements, because they are usually damp and cool, are often ideal storage places for root crops, potatoes, and leafy vegetables. Some heat may be needed in very cold weather to prevent the vegetables from freezing.

In heated basements, utility rooms or other basement space not walled off from the furnace and yet some distance away can be used for storage during part of the winter. However, because many vege-



tables need to be kept moist during storage, the high temperature is sure to cause some decay.

Basement storeroom. Vegetable storage in heated basements is practical, cheap, convenient, and usually satisfactory if a cool well-ventilated storeroom, 6 by 6 feet or larger is partitioned off from a corner of the basement (see drawing on opposite page).

The partition wall can be a 2-by-4-inch framework covered inside and outside with lumber, wallboard, or plywood. Place a layer of waterproof building paper between the studding and the outer covering, and fill space between studs with insulating material. Ceil the storeroom overhead and place 4 inches of insulation between the joists.

Adjust the basement window in the room to serve as a ventilator. Replace one glass pane with a small hinged cover. Remove another pane and fit a wooden duct about one square foot in area into the opening, extending it almost to the floor. Air circulation, temperature, and humidity can then be regulated by adjusting the door and the window openings.

Garage. The garage and other service buildings, altho unheated, may be used to store, for a short time, many crops damaged by freezing. Most root crops put in boxes of moist sand or soil will keep for two or three months. Parsnips, salsify, or horseradish boxed in the same way can remain in the garage all winter.

Attic. Poor ventilation and a wide variation in temperature limit the value of the attic as a storage place. Cross-ventilation will help to prevent extreme heat, but it is difficult to keep the attic warm in very cold weather and cool in hot weather. Only crops that are fairly clean, easy to handle, and not injured by high temperatures and dry air should be stored in the attic.

Popcorn, herbs, and dried seed can remain there indefinitely. Pumpkins and squash, however, will not keep long in cold weather.

Outdoor pits. In northern Illinois, where the winters remain constantly cold, root crops, cabbage, and potatoes are often stored in outdoor pits as described on page 2; in central and southern Illinois pits are not so satisfactory.

Sunken barrel. Root crops and potatoes can be stored in a barrel or wooden box buried in the ground. Set the barrel at a slant, with the high open end to the south and cover it with straw or similar material and soil. The advantage of this method is that the vegetables are easy to get out; the disadvantage is the difficulty of getting a suitable barrel or box.

Outdoor underground cellar.¹ As a storage place for root crops, potatoes, and cabbage a permanent outdoor underground cellar is

¹A blueprint plan for this cellar can be obtained from the Department of Agricultural Engineering, University of Illinois, Urbana. Call for Plan 5176.

superior to temporary or indoor storage places. The cellar is built partially or entirely below the ground level, preferably in a hillside or on sloping ground, and where drainage is good. The most satisfactory construction is of concrete. A fill of 2 feet or more of earth is made over the cellar.

Such a storage cellar is relatively expensive, the cost for the recommended 8-by-12-foot size usually exceeding \$200. But it is a permanent structure and may be useful also as an emergency shelter from storms.

The cellar can sometimes be built just outside the foundation wall of the house, with a direct entrance to it from the basement.

Aboveground storeroom. Less expensive and simpler to build than the underground types, this kind of storeroom requires more attention to keep vegetables safely. It can easily be converted to other uses when no longer needed for vegetable storage.

A small building of the usual wood-frame or masonry construction is suggested. Walls and roof are insulated with 4 inches or more of sawdust, shavings, or commercial insulation. A small heater is needed to keep the temperature above freezing in severe winter weather. The flue from the heater will help provide the necessary circulation of air.

Varieties for Storage

Altho some varieties of vegetables keep better in home storage than others, it is usually far more important that the vegetables are at a proper stage of maturity and free from mechanical injuries and disease than that they should be of a certain variety.

The following varieties are known to store very well in Illinois under good conditions. Many others may store almost as well. Only those vegetables are listed that are most commonly grown in Illinois and show varietal differences in keeping quality.

Beets.....	<i>Detroit Dark Red</i> (other varieties store fairly well)
Carrots	<i>Chantenay</i> , <i>Danvers</i> type (coreless types do not store so well)
Cabbage.....	Varieties with firm compact heads
Onions.....	American types such as <i>Ebenezer</i> and <i>Globe</i>
Potatoes.....	Late plantings of either early or late varieties
Pumpkins.....	<i>Small Sugar</i> , <i>Kentucky Field</i>
Squash.....	<i>Delicious</i> , <i>Hubbard</i> (<i>Table Queen</i> and <i>Delicata</i> can be stored for a short period)
Sweet potatoes.....	<i>Nancy Hall</i> , <i>Yellow Jersey</i>
Turnips.....	<i>Purple Top White Globe</i>